

Worm Drive System for Telescopes and LIDAR Systems

Abstract

An invention consisting of a worm drive system for astronomical telescopes, light detection and ranging (LIDAR) systems, and other implements which require precision in pointing, motion and tracking about an axis of revolution. The worm drive system consists of a plate assembly supporting in precise fashion: a hub assembly, a worm assembly and a motor assembly. The design and interaction of these assemblies makes the invention relatively immune to variations in ambient temperature during the operation of the invention, thereby preserving said precision during the operation of the invention. The hub assembly supports a worm gear, includes a simple method for attachment of the invention to the axis of revolution of the implement, and includes an adjustable clutch mechanism for the worm gear, with the clutch mechanism so designed as to maintain precise coaxial alignment of the worm gear axis relative to the hub assembly axis and therefore the axis of revolution of the implement. The worm assembly supports a worm and includes a pivot point, the entire worm assembly being

balanced about the pivot point, thereby preserving precise alignment and coupling of the worm relative to the worm gear irrespective to all possible orientations of the invention which may occur during the invention's operation. The motor assembly supports a motor providing for axial rotation of the worm via, for example, a pair of pulleys and a belt, the purpose of the motor assembly being the prevention of the motor's torque, were the motor directly attached to the worm as is a common practice, from disturbing the precise alignment and coupling of the worm relative to the worm gear. The plate assembly includes a load block serving as a point of attachment for one end of a threaded rod, the other end of the threaded rod being attached to the implement, thereby precisely holding the plate assembly in a static position relative to the implement and the implement's axis of revolution, thereby allowing the axial rotation of the worm, via action of the motor, to precisely rotate the hub assembly and therefore the implement about the implement's axis of revolution.